Natural Resource Project Funds Implementation Plan
FY 2000 and FY 2001 Resource Management Funding

(revised 2/4/00)

Himalaya Blackberry Control at Garden Creek,
Grand Canyon National Park, Arizona

Problem Statement:

Himalaya blackberry (*Rubus procerus* [*R. discolor*]) is a vigorous, non-native plant species found along Garden Creek in Grand Canyon National Park. In 1992, a survey reported that the blackberry had colonized about four acres of riparian habitat in Garden Creek vicinity, and by 1996 the population had expanded and it now colonizes over 1.5 miles of the riparian zone along Garden Creek (Rihs 1996, and personal observation, N. Brian, Sept. 1996). In 1999, an isolated patch was documented down below the waterfall where Garden Creek drops into Pipe Creek, about 500m from the Colorado River. The population is spreading and approaching the Colorado River, which could allow it to spread into some of the nation's remaining pristine desert riparian plant communities.

The Natural Resources Management Guideline (National Park Service, 1991, p289) states that "control or eradication [of exotic species] will be undertaken, where feasible, if exotic species threaten to alter natural ecosystems; or seriously...compete with native populations." The Himalaya blackberry along Garden Creek certainly falls into this category. In addition, the Grand Canyon Resource Management Plan recognizes the need to control the blackberries. The RMP includes project statements calling for the rehabilitation of selected wetland/riparian areas impacted by exotics (GRCA-N-140.01), including Garden Creek, as a Priority One statement.

Specific Objectives:

The primary goal of this project is to restore the native vegetation along Garden Creek near Indian Gardens. The objectives of this project are to:

1. Eradicate the Himalaya blackberry from along Garden Creek.
2. Revegetate the riparian area along Garden Creek with native plant species.
3. Educate the public and Park employees through the duration of this project.

Approach and Methods:

The eradication plan for the Himalaya blackberry consists of mechanical removal of the canes at the root stock using pruning saws, anvil pruners, and other tools such as brush cutters. This method is preferable, as the brambles are often intertwined with other native grasses, herbs, shrubs, and trees which would be impacted by a foliar spray. Prescribed fire may be used to initially clear certain areas of the thicket and expose the primary canes for further treatment. Following cane removal, the root crown and remaining live stems will be chemically treated with an herbicide. Rodeo, an herbicide approved by the

National Park Service (NPS) that is highly effective on Himalaya blackberry, will be used to treat the blackberries. In areas where prescribed fire is not used to clear the canes, they will be manually removed, deposited in an existing, nearby, human-made ditch where they will be dried and then burned. Follow-up treatments of pruning and chemical treatment will be undertaken to eradicate any new growth. Following eradication, the treated zone will be rehabilitated. This will be done through plantings of native riparian species. Upon completion of the project, the burning ditch will be backfilled with soil, if necessary, and revegetated.

A long-term vegetation monitoring program will be designed and installed prior to the initiation of this eradication project. This system will allow the Park to monitor vegetation change over time. An initial survey and list of plant species in the Indian Gardens area will be completed. Permanent photopoints will be installed along Garden Creek. A Global Positioning System (GPS) unit will be used to mark the location of these points. The GPS unit will also be used to outline the periphery of the blackberry population. An overall map of Garden Creek including the above information will be developed using Geographic Information System (GIS) software. Several line transects will be installed (number and length still to be determined and will be based on initial sampling) and the point intercept method will be used to measure vegetation cover. The beginning and endpoints of these transects will be recorded with the GPS unit, as well as photographs. The data derived from the transects will be used to determine the success of the project. Initial estimates are that less than 10% cover of blackberry after a 5-year period will be considered a success, although complete control after a 5 year period is the ultimate goal. During the project, square meter frames may be used to determine blackberry density. Other pertinent data may be obtained as part of the monitoring program.

A biological technician under the direction of Grand Canyon's habitat restoration specialist will supervise the proposed work. Most of the work will be completed with volunteer labor through Grand Canyon National Park's partnership with the Sierra Club, Northern Arizona University, and other universities. The park's botanist, hydrologist, wildlife biologist, and revegetation specialist will be available to discuss specific site problems and solutions. It is estimated that this project will require two six-month seasons to complete. In addition, it is anticipated that approximately 2,000 volunteer hours, over the two-year period, will be necessary to eradicate and restore this area. Volunteers will hike to Indian Gardens where they will camp while fieldwork is being conducted. (In FY98 over 14,000 hours of volunteer time were donated to park revegetation projects.)

Other exotic species in the vicinity, such as horehound (*Marrubium vulgare*) and horse-nettle (*Solanum elaeagnifolium*), will also be mechanically eradicated during this project. Complete lists of species names and numbers eradicated will be included in all annual reports.

A stream gauge is located in the upper part of the Himalaya blackberry area. This gauge is used by the park hydrologist for a long-term water quantity monitoring project to test

the impacts of groundwater withdrawals from outside the park boundary on groundwater studies. The gauge had originally precluded the removal of blackberries in the area above the gauge. However, the park hydrologist has discontinued the use of this gauge. Blackberries will be eradicated both above and below the gauge during the two year timeframe specified within this proposal.

Eradication efforts will be interpreted to the visiting public through information disseminated in the park's visitor newsletter, the Indian Gardens ranger, and an article in the Grand Canyon *Nature Notes*.

Tasks:

Task #1 Description: Research Native Vegetation Along Garden Creek

A comprehensive search of the Park's archived records and photographs will be conducted for information about the native vegetation along Garden Creek. There is still some debate about when the Himalaya blackberry was introduced into the area. This must be determined prior to the implementation of the control project. If the blackberry is indeed considered historic, a small area containing the species may be retained for interpretive and educational purposes.

Deliverable Description: Information will be included in the first annual report produced for this project.

Deliverable Due Date: November 1, 2000

Task #2 Description: Complete Environmental Assessment and Public Review

Prior to project initiation, Park staff will complete the Environmental Assessment (EA) for this project. An initial Categorical Exclusion has been completed for this project, but Park staff has determined that a more thorough compliance document should be written. The public review period will be 60-90 days. Any blackberry removal efforts will be postponed until this process is complete.

Deiliverable Description: A complete compliance document for the overall project.

Deliverable Due Date: June 30, 2000

Task #3 Description: Complete Prescribed Fire Burn Plan

Prescribed fire will be used to clear the thickets in 2 of the 4 major phases of this project. The Park's Prescribed Fire Crew will complete a Burn Plan for the overall project area. This document will be completed several months prior to the estimated burn time. It is expected that the large areas will be burned during late January or early February of 2001. This timing coincides with low fuel moisture levels and the minimum number of visitors in the Indian Gardens area. The timing of the fire will also depend on numerous

factors such as weather and funding, but the primary goal is to open up the area to make treatment of the primary canes more feasible.

Deliverable Description: Completed burn plan for the project area.

Delieverable Due Date: September 30, 2000

Task #4 Description: Install a Vegetation Monitoring System

Prior to project initiation, the Park's revegetation crew will install a system to monitor the change in vegetation along Garden Creek. The monitoring system will include photomonitoring in addition to line transects. A map of the area and the blackberry infestation will be developed using GPS units and GIS software. Monitoring will continue for at least 5 years after project completion.

Deliverable Description: Annual monitoring reports. These reports will include copies of photographs from the photomonitoring system, in addition to data collected from the vegetation transects described in the methods section.

Deliverable Due Date: November 1, 2000 and 2001

Task #5 Description: Himalaya Blackberry Removal

Remove Himalaya blackberry from around structures and trees along Garden Creek, and also remove the isolated population from along Pipe Creek (below the Garden Creek waterfall). Continue with removal efforts along Garden Creek as time allows. The removal efforts will be prioritized with the goal of containing the population. Due to the impenetrable nature of the dense thickets, prescribed fire may be used as one part of the control program.

Deliverable Description: Annual report including descriptions of volunteer hours donated, total area from which the blackberry was removed, herbicide application forms, and other data derived from the control process.

Deliverable Due Date: November 1, 2000

Task #6 Description: Collect native seeds and cuttings

Collect seeds and cuttings from native vegetation. Material will be used for the revegetation phase of this project. Propagate species as needed during the winter of 2000-2001.

Deliverable Description: Annual report including information about the amount of seed collected, the number of cuttings collected, and propagation needs for the following season.

Deliverable Due Date: November 1, 2000

Task #7 Description: Complete the removal of Himalaya blackberry from Garden Creek.

The eradication plan for the Himalaya blackberry consists of mechanical removal of the canes at the root stock using pruning saws, anvil pruners, and other tools. Following cane removal, the root crown and remaining live stems will be chemically treated with an herbicide. Garlon or Rodeo, two herbicides approved by the NPS, will be used to treat the blackberries. The canes will be removed, deposited in an existing, nearby, man-made ditch, dried, and then burned.

Deliverable Description: Annual report including descriptions of volunteer hours donated, total area from which the blackberry was removed, herbicide application forms, and other data derived from the control process.

Deliverable Due Date: November 1, 2001

Task #8 Description: Revegetate Garden Creek with native plant species.

The revegetation portion will be ongoing as the removal efforts occur. Native species will be propagated and planted throughout the project.

Deliverable Description: Annual report including data on the total number of plants used in the revegetation process, survival and mortality percentages, and total number of volunteer hours donated to this portion of the project.

Deliverable Due Date: November 1, 2000 and 2001

Task #9 Description: Rehabilitate the Human-Made Ditch Used During this Project

The ditch used for burning of the blackberry canes will be rehabilitated. The ditch will be backfilled with soil and revegetated with native vegetation.

Deliverable Description: N/A

Deliverable Due Date: N/A

Task #10 Description: Monitoring of Project

Ongoing monitoring will be conducted throughout the projects. Photographs will be taken from the permanent photopoints 2 times a year. Data will be collected along the line transects 2 times per year.

Deliverable Description: Information will be included in the annual reports.

Deliverable Due Date: November 1, 2000 and 2001

Task #11 Description: Distribute Project Information and Publish Articles

Information on the methodology, effort, and success of this eradication program will be distributed to other Federal park and monument units as well as other Federal agencies, state and university weed or agricultural programs and gardens and arboretums through articles and presentation at resource management symposiums. Articles will be prepared for publication in Grand Canyon Nature Notes, the Park's visitor newsletter, and additional publications.

Deliverable Description: Articles and presentations will be prepared and delivered throughout the project.

Deliverable Due Date: Ongoing throughout the project

Schedule:

Please see the schedule table included in at the end of this detailed itinerary. The project will primarily be conducted during the months of March, April, May, September, October and November. The prescribed burn, however, will be conducted during January or February of the second year. Most of the removal efforts will have to be postponed until the Environmental Assessment is completed. If this process is complete in April 2000, we may begin spring removal work shortly thereafter which would slightly change the timetable.

Deliverables:

The deliverables from this project are described in detail in the task's section above. Annual reports will be due on November 1 of 2000 and 2001.

Staffing Needs and Budget:

A total of $54,000 over two years is requested for the Himalaya blackberry eradication program: $27,000 for Fiscal Year 2000 and $27,000 for Fiscal Year 2001. The majority of the project cost is salary for two GS-5 Biological Technicians for two six month seasons (approximately $49,400). The technicians will be responsible for supervision of the day-to-day field work, purchasing equipment and supplies, and communication with the park's restoration biologist and partnership organizations and individuals. An additional $1000 is needed for the herbicide and $3,600 for volunteer supplies, equipment (gloves, protective spray suits, pruning tools, etc.), and food. The use of an estimated 2,000 volunteer hours, equal to $17,000 or more of in-kind services, will assist with completion of the project. Follow-up work in FY2001 will ensure no resprouting occurs. Any regrowth from previously treated rootstocks will be noticeable and easily treated. The prescribed fire work will be funded through the park's fire budget.

Budget Table

FY2000

	Cost
Two GS-5 Biological Technicians (12 pay periods @ $942 per pay period)	$22,600
Herbicide	$ 1,000
Volunteer Supplies (Gloves, protective spray suits, pruning tools, etc.)	$ 900
Food for Volunteers ($15 per person/day – assuming 100 volunteer days)	$ 1,500
Propagation Supplies (Soil mix and rooting hormones)	$ 1,000

FY2001

	Cost
One GS-5 Biological Technician (12 pay periods @ $980 per pay period)	$11,750
One GS-5 Biological Technician (13 pay periods @ $980 per pay period)	$12,750
Herbicide	$ 1,000
Food for Volunteers ($15 per person/day assuming 100 volunteer days)	$ 1,500

TOTAL PROJECT COST: $54,000

Schedule for Grand Canyon Indian Gardens Blackberry Removal Project

Revised Schedule for FY2001
(Project Year Two)

Task No.	Description	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July	Aug	Sept
1	Blackberry removal	X	X	X	X	X	X	X	X				
2	Native plant material collection	X	X		X								
3	Complete blackberry removal	X	X			X	X	X	X				X
4	Revegetate Garden Creek	X	X			X	X	X	X	X			X
5	Conduct monitoring	X	X		X	X		X	X				X
6	Follow-up treatments	X	X		X	X	X	X	X	X	X	X	X
7	Distribute information and publish articles	X	X			X	X	X	X				

Please note that a final project report will be due on December 31, 2001. The reports will include information about vegetation monitoring, blackberry removal, site revegetation, volunteer hours donated, and education and interpretation of the project.